

# PATENT SPECIFICATION

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(19)



## (54) VEHICLE REAR-VIEW MIRROR

(71) We, COMBINED OPTICAL INDUSTRIES LIMITED, a British Company, of 200 Bath Road, Slough SL1 4DW, Berkshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a vehicle rear-view mirror comprising a support structure supporting a generally convex reflecting surface having a curvature which is greater at sides of the surface than in the centre of the surface. The invention has particular, but not exclusive, application to internal rear-view mirrors for road vehicles such as cars.

It is known that a convex vehicle rear-view mirror of uniform curvature provides an increased field of view over a plane rear-view mirror. However, such a convex mirror produces a reduced image size. To optimise the size of the image and the field of view, it is known to provide a generally convex mirror having a relatively complex reflective surface characteristic and which has a greater curvature at its sides than in its centre. Such a mirror is described in U.S. Patent Specification No. 3,003,396. However, it has been difficult to produce such a complex reflective surface in a manner that can be rigidly supported in a vehicle so that it does not vibrate in use, and can be easily and cheaply installed without modification to the vehicle.

It is an object of the invention to provide an improved vehicle rear-view mirror that can have a relatively complex reflective surface and which includes a simple, cheap and effective support structure for the reflective surface so as to enable the mirror to be rigidly and simply installed in a vehicle such that the mirror will not tend to vibrate, break or distort when subjected to shocks or vibration.

According to the present invention, there is provided a vehicle rear-view mirror comprising a support structure supporting a generally convex reflective surface having a curvature which is greater at sides of the surface than at the centre of the surface the support structure being in the form of a closed box structure with the reflective surface formed on a wall of the box structure.

By means of the box structure, a relatively strong and rigid mirror is provided, which can easily be installed in a vehicle.

The mirror of the invention preferably includes elasticated bands which pass through the box structure. The bands are used to install the mirror of the invention on a conventional rear-view mirror already installed in the vehicle. The bands can also be used to hold portions of the box structure together.

The mirrors of the invention are preferably made of two moulded plastics parts, one part (the "front part") being formed with the generally convex reflecting surface, and the other part (the "rear part") being generally planar and coextensive with the front part, the two parts fitting together to form a hollow elongated box structure.

The two parts may conveniently (but not necessarily) be moulded of the same material, which may conveniently be, for example, a polycarbonate or polymethacrylate resin.

In order that the invention may be more fully understood, one form of mirror will now be described, by way of illustration only, with reference to the drawings accompanying the provisional specification, in which:

Figure 1 is a front view of the mirror (as the driver sees it);

Figure 2 is a top plan view of the mirror shown in Figure 1;

Figure 3 is a perspective view of the mirror.

ror of Figures 1 and 2 installed on an existing rear-view mirror of a vehicle; and

Figure 4 is a schematic top plan view of a car including the mirror of Figures 1 and 2.

The mirror shown in the drawings comprises a two piece box structure which includes means for installing the mirror to cover the reflecting surface of a conventional rear-view mirror previously installed in the vehicle.

The mirror comprises a front part or box member 1 closed by a second part or lid 2, the box member and lid each being formed of plastics material. The box member 1 includes a front reflective surface 3, which has a radius of curvature that varies across the width of the mirror, i.e. from edge 4 to edge 5. In the embodiment illustrated, the surface 3 has a central zone 3a which is spherical and has a radius of curvature that is relatively large, e.g. 30 inches. The central zone 3a is bounded by two lines moulded as ridges 6 and 7 on the interior of the box. Second zones 3b and 3c extend from the ridges 6 and 7 to the edges 4 and 5. The second zones form parts of an aspheric surface which yield a wider field of view for unit mirror than does the central zone.

The box member 1 can conveniently be made of a transparent plastics material and the surface 3 can be made reflective by metallising the interior (or exterior) of the box member.

The lid 2 has a substantially planar outer surface and includes a lip 8 which engages a corresponding lip 9 on the box member 1. Two elasticated bands 10 and 11 are provided for attaching the mirror to the rear view mirror 30 previously installed in the vehicle. The bands pass through slots 12, 13, 14 and 15 in the side walls of the box member and are slipped over the edges of the previously installed mirror, as shown in Figure 3. When installed, the bands 10, 11 hold the lid in place on the box member 1, and the lid 2 is provided with strips of plastics 100 foam material glued to its surface to cushion the lid 2 against the surface of the existing mirror to prevent the latter from becoming scratched.

To allow the bands 10 and 11 to be installed in the box member 1, further slots are provided which each extend from one of the slots 12, 13, 14 and 15 to the lip 9. Two such further slots, 16 and 17, are shown in Figure 2.

Referring now to Figure 4 of the drawings, the mirror is shown mounted in position adjacent the windscreen 20 of the car. The car has a rear window 21 and rear side windows 22, 23 and front side windows 24, 25.

On looking into the mirror, the driver

26 sees the rear window 21 by reflection of light from the central zone of the mirror. The central zone has a relatively large radius of curvature (up to infinity) and the minification of the image is small compared to that produced by the second zone. When the driver looks into the second zones of the mirror, by virtue of their disposition relative to the central zone and their smaller radius of curvature, he is able to see through the side windows of the vehicle. (The driver's field of vision is indicated by the dotted lines — which are shown only for one eye.) Thus, the second zones provide the driver with a view through the rear side windows 22 and 23 and through the rearward portions of the front side windows 24 and 25.

It will be understood that the precise shape of the reflecting surface of the mirror can be determined with regard to the shape and dimensions of the vehicle in which it is employed. Any number of zones of different curvature may be used and the reflecting surface can be of continuously changing curvature, i.e. ellipsoid. Conveniently, each second, third and so on, zone will be of the same curvature but this is not essential and each of the two second zones may be of different curvature. The mirror need not have an equal number of zones on each side of the central zone.

In a particularly preferred arrangement for a motor car, the radius of curvature of the reflecting surface approaching the side edges of the mirror will be such that as the image of an over-taking vehicle on the off-side just disappears from view, the vehicle itself enters the driver's normal forward field of view without the driver turning his head. That is to say, the vehicle can be seen by the driver out of "the corner of his eye".

#### WHAT WE CLAIM IS:

1. A vehicle rear-view mirror comprising a support structure supporting a generally convex reflective surface having a curvature which is greater at sides of the surface than at the centre of the surface, the support structure being in the form of a closed box structure with the reflective surface formed on a wall of the box structure.

2. A mirror according to claim 1, wherein the box structure is formed of two moulded plastics parts.

3. A mirror according to claim 2, wherein at least one of the parts is formed of transparent plastics material.

4. A mirror according to any preceding claim, wherein the box structure includes a metallised reflective surface.

5. A mirror according to any preceding claim, which includes one or more elasticated bands passing through slots in the box structure for mounting the mirror on a sup-

port surface.

6. A mirror according to claim 5, which has a resilient material on an outer surface to cushion the outer surface against the support surface when mounted thereon to prevent damage to the support surface.

7. A mirror according to claim 5 or 6 wherein the elasticated band(s) serve(s) also to hold together portions of the box structure.

8. A mirror according to any preceding claim, wherein the reflective surface includes a central portion and contiguous adjacent second portions, the curvature of second portions being greater than the curvature of

the central portion.

9. A vehicle rear-view mirror substantially as herein described with reference to the drawings accompanying the provisional specification.

10. A vehicle rear-view mirror as claimed in any preceding claim mounted on a support surface interiorly of a vehicle.

11. A vehicle rear-view mirror as claimed in claim 5 or 6 mounted on a rear-view mirror in a road vehicle.

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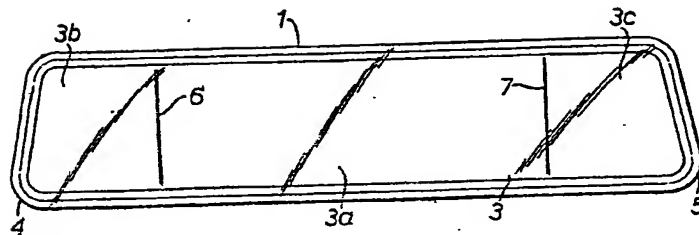


FIG. 1.

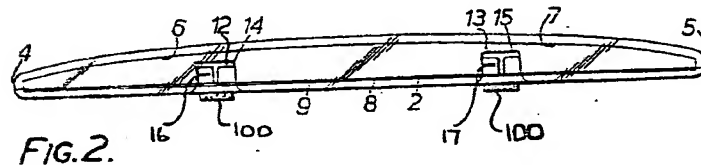


FIG. 2.

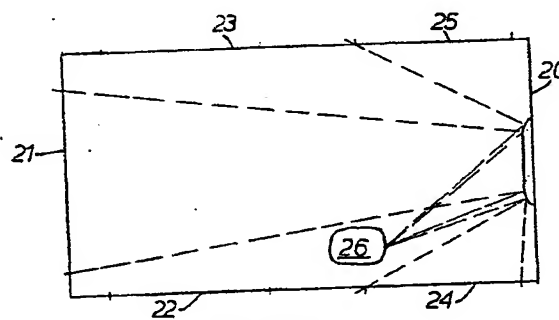


FIG. 4.

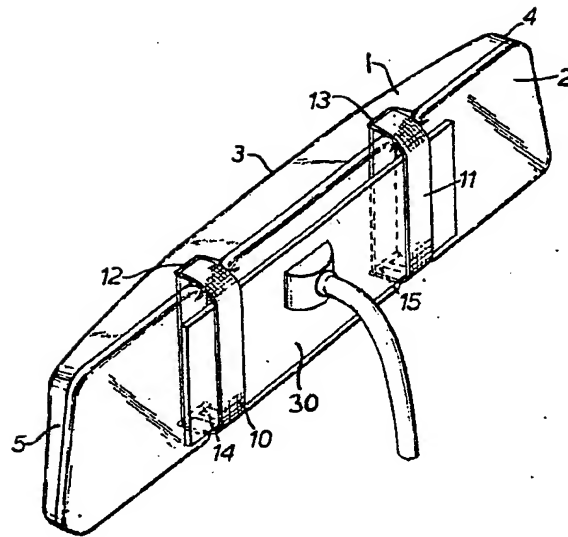


FIG. 3.

